## VARC

The passage below is accompanied by a set of questions. Choose the best answer to each question.

The word 'anarchy' comes from the Greek anarkhia, meaning contrary to authority or without a ruler, and was used in a derogatory sense until 1840, when it was adopted by Pierre-Joseph Proudhon to describe his political and social ideology. Proudhon argued that organization without government was both possible and desirable. In the evolution of political ideas, anarchism can be seen as an ultimate projection of both liberalism and socialism, and the differing strands of anarchist thought can be related to their emphasis on one or the other of these.

Historically, anarchism arose not only as an explanation of the gulf between the rich and the poor in any community, and of the reason why the poor have been obliged to fight for their share of a common inheritance, but as a radical answer to the question 'What went wrong?' that followed the ultimate outcome of the French Revolution. It had ended not only with a reign of terror and the emergence of a newly rich ruling caste, but with a new adored emperor, Napoleon Bonaparte, strutting through his conquered territories.

The anarchists and their precursors were unique on the political Left in affirming that workers and peasants, grasping the chance that arose to bring an end to centuries of exploitation and tyranny, were inevitably betrayed by the new class of politicians, whose first priority was to re-establish a centralized state power. After every revolutionary uprising, usually won at a heavy cost for ordinary populations, the new rulers had no hesitation in applying violence and terror, a secret police, and a professional army to maintain their control.

For anarchists the state itself is the enemy, and they have applied the same interpretation to the outcome of every revolution of the 19th and 20th centuries. This is not merely because every state keeps a watchful and sometimes punitive eye on its dissidents, but because every state protects the privileges of the powerful.

The mainstream of anarchist propaganda for more than a century has been anarchist-communism, which argues that property in land, natural resources, and the means of production should be held in mutual control by local communities, federating for innumerable joint purposes with other communes. It differs from state socialism in opposing the concept of any central authority. Some anarchists prefer to distinguish between anarchist-communism and collectivist anarchism in order to stress the obviously desirable freedom of an individual or family to possess the resources needed for living, while not implying the right to own the resources needed by others. . . .

There are, unsurprisingly, several traditions of individualist anarchism, one of them deriving from the 'conscious egoism' of the German writer Max Stirner (1806–56), and another from a remarkable series of 19th-century American figures who argued that in protecting our own autonomy and associating with others for common advantages, we are promoting the good of all. These thinkers differed from free-market liberals in their absolute mistrust of American capitalism, and in their emphasis on mutualism

Q.1    Which one of the following best expresses the similarity between American individualist anarchists and free-market liberals as well as the difference between the former and the latter?

A. Both reject the regulatory power of the state; but the former favour a people's state, while the latter favour state intervention in markets.

B. Both prioritise individual autonomy; but the former also emphasise mutual dependence, while the latter do not do so.

C. Both are sophisticated arguments for capitalism; but the former argue for a morally upright capitalism, while the latter argue that the market is the only morality.

D. Both are founded on the moral principles of altruism; but the latter conceive of the market as a force too mystical for the former to comprehend.

Ans.   Individualist anarchism, according to the last paragraph, involves "protecting our own autonomy and associating with others for common advantages". The last line of the passage states that these thinkers "differed from free-market liberals in their absolute mistrust of American capitalism, and in their emphasis on mutualism. "In other words, while both individualist anarchists and free-market thinkers agreed on the importance of individual autonomy, individualist anarchists distrusted capitalism and put emphasis on mutualism while free-market thinkers did not.

All other options mention ideas like state intervention in markets, morally upright capitalism and altrusim which are not discussed in the passage.

Q.2    The author makes all of the following arguments in the passage, EXCEPT:

A. Individualist anarchism is actually constituted of many streams, all of which focus on the autonomy of the individual.

B. The popular perception of anarchism as espousing lawlessness and violence comes from a mainstream mistrust of collectivism.

C. For anarchists, the state is the enemy because all states apply violence and terror to maintain their control.

D. The failure of the French Revolution was because of its betrayal by the new class of politicians who emerged from it.

Ans.   The passage makes no mention of the mainstream mistrust of collectivism. In the last paragraph, the passage states that "there are, unsurprisingly, several traditions of individualist anarchism..". So, option A is true.

Option C is true, based on paragraphs 3 and 4: "For anarchists the state itself is the enemy....because every state keeps a watchful and sometimes punitive eye on its dissidents..". Paragraph 3 talks about the "violence and terror" applied by centralised state power.

Option D is also true, based on paragraphs 2 and 3: French Revolution "had ended not only with a reign of terror and the emergence of a newly rich ruling caste" and "workers and peasants, grasping the chance that arose to bring an end to centuries of exploitation and tyranny, were inevitably betrayed by the new class of politicians..."

Q.3    According to the passage, what is the one idea that is common to all forms of anarchism ?

A. There is no idea common to all forms of anarchism; that is why it is anarchic.

B. They all focus on the primacy of the power of the individual.

C. They all derive from the work of Pierre-Joseph Proudhon.

D. They are all opposed to the centralisation of power in the state.

Ans.    The passage clearly states that "for anarchists the state itself is the enemy and they have applied the same interpretation to the outcome of every revolution of the 19th and 20th centuries.". Note that option B is incorrect because it talks of the 'primacy' of the individual while anarchism puts emphasis on mutualism.

Q.4    The author believes that the new ruling class of politicians betrayed the principles of the French Revolution, but does not specify in what way. In the context of the passage, which statement below is the likeliest explanation of that betrayal?

A. The new ruling class rode to power on the strength of the workers' revolutionary anger, but then turned to oppress that very class.

B. The anarchists did not want a new ruling class, but were not politically strong enough to stop them.

C. The new ruling class was constituted mainly of anarchists who were against the destructive impact of the Revolution on the market.

D. The new ruling class struck a deal with the old ruling class to share power between them.

Ans.     The passage discusses the French Revolution and goes on to state in paragraph 3 that "after every revolutionary uprising, usually won at a heavy cost for ordinary populations, the new rulers had no hesitation in applying violence and terror, a secret police, and a professional army to maintain their control. "So, option A is the correct choice.

Q.5    Of the following sets of concepts, identify the set that is conceptually closest to the concerns of the passage.

A. Anarchism, Betrayal, Power, State.

B. Revolution, State, Strike, Egoism.

C. Revolution, State, Protection, Liberals.

D. Anarchism, State, Individual, Freedom.

Ans.   Only options A and D mention anarchism, which is the main idea of the passage. Option A does not mention 'freedom' and individual', which are discussed in the last two paragraphs. So, D is the best choice.

The passage below is accompanied by a set of questions. Choose the best answer to each question.

In the late 1960s, while studying the northern-elephant-seal population along the coasts of Mexico and California, Burney Le Boeuf and his colleagues couldn't help but notice that the threat calls of males at some sites sounded different from those of males at other sites. . . . That was the first time dialects were documented in a nonhuman mammal. . . .

All the northern elephant seals that exist today are descendants of the small herd that survived on Isla Guadalupe [after the near extinction of the species in the nineteenth century]. As that tiny population grew, northern elephant seals started to recolonize former breeding locations. It was precisely on the more recently colonized islands where Le Boeuf found that the tempos of the male vocal displays showed stronger differences to the ones from Isla Guadalupe, the founder colony.

In order to test the reliability of these dialects over time, Le Boeuf and other researchers visited Año Nuevo Island in California—the island where males showed the slowest pulse rates in their calls—every winter from 1968 to 1972. "What we found is that the pulse rate increased, but it still remained relatively slow compared to the other colonies we had measured in the past" Le Boeuf told me.

At the individual level, the pulse of the calls stayed the same: A male would maintain his vocal signature throughout his lifetime. But the average pulse rate was changing. Immigration could have been responsible for this increase, as in the early 1970s, 43 percent of the males on Año Nuevo had come from southern rookeries that had a faster pulse rate. This led Le Boeuf and his collaborator, Lewis Petrinovich, to deduce that the dialects were, perhaps, a result of isolation over time, after the breeding sites had been recolonized. For instance, the first settlers of Año Nuevo could have had, by chance, calls with low pulse rates. At other sites, where the scientists found faster pulse rates, the opposite would have happened—seals with faster rates would have happened to arrive first.

As the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the founder colony. In the decades that followed, scientists noticed that the geographical variations reported in 1969 were not obvious anymore. . . . In the early 2010s, while studying northern elephant seals on Año Nuevo Island, [researcher Caroline] Casey noticed, too, that what Le Boeuf had heard decades ago was not what she heard now. . . . By performing more sophisticated statistical analyses on both sets of data, [Casey and Le Boeuf] confirmed that dialects existed back then but had vanished. Yet there are other differences between the males from the late 1960s and their great-great-grandsons: Modern males exhibit more individual diversity, and their calls are more complex. While 50 years ago the drumming pattern was quite

simple and the dialects denoted just a change in tempo, Casey explained, the calls recorded today have more complex structures, sometimes featuring doublets or triplets. . . .

Q.6    Which one of the following conditions, if true, could have ensured that male northern elephant seal dialects did not disappear?

A. Besides Isla Guadalupe, there was one more surviving colony with the same average male call tempo from which no migration took place.

B. The call tempo of individual male seals in host colonies changed to match the average call tempo of immigrant male seals.

C. Besides Isla Guadalupe, there was one more founder colony with the same average male call tempo from which male seals migrated to various other colonies.

D. The call tempo of individual immigrant male seals changed to match the average tempo of resident male seals in the host colony.

Ans.   According to the passage, the possible reason for dialects disappearing is that "as the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the *founder* colony". If, instead, the call tempo of the immigrant seals changed to match that of the host colony (each of which has a different dialect), then dialects would be different.

Option A is incorrect as it is the *immigrant* male seals that change the average call tempo. Option B states exactly what happened, resulting in the diappearance of dialects. The scenario in option C would not change the outcome in any way.

Q.7    All of the following can be inferred from Le Boeuf's study as described in the passage EXCEPT that:

A. changes in population and migration had no effect on the call pulse rate of individual male northern elephant seals.

B. the influx of new northern elephant seals into Año Nuevo Island would have soon made the call pulse rate of its male seals exceed that of those at Isla Guadalupe.

C. male northern elephant seals might not have exhibited dialects had they not become nearly extinct in the nineteenth century.

D. the average call pulse rate of male northern elephant seals at Año Nuevo Island increased from the early 1970s till the disappearance of dialects.

Ans.   According to the passage, over time, with migrations, the calls regressed to the average pulse rate of the founder colony in Isla Guadalupe. The passage does not indicate that the influx of new northern elephant seals into Año Nuevo Island would have made the call pulse rate of its male seals *exceed* that of those at Isla Guadalupe.

All other options can be inferred:

Option A: "At the individual level, the pulse of the calls stayed the same: A male would maintain his vocal signature throughout his lifetime."
Option C: "This led Le Boeufvand his collaborator, Lewis Petrinovich, to deduce that the dialects were, perhaps, a result of isolation over time, after the breeding sites had been recolonized."

Option D: "In the decades that followed, scientists noticed that the geographical variations reported in 1969 were not obvious anymore."

The question is "All of the following can be inferred from Le Boeuf's study as described in the passage EXCEPT that:"

Hence, the answer is, "the influx of new northern elephant seals into Año Nuevo Island would have soon made the call pulse rate of its male seals exceed that of those at Isla Guadalupe."

Q.8    Which one of the following best sums up the overall history of transformation of male northern elephant seal calls?

A. Owing to migrations in the aftermath of near species extinction, the calls have transformed from exhibiting complex composition, less individual variety, and great regional variety to simple composition, less individual variety, and great regional variety.

B. The calls have transformed from exhibiting simple composition, great individual variety, and less regional variety to complex composition, less individual variety, and great regional variety.

C. Owing to migrations in the aftermath of near species extinction, the average call pulse rates in the recolonised breeding locations exhibited a gradual increase until they matched the tempo at the founding colony.

D. The calls have transformed from exhibiting simple composition, less individual variety, and great regional variety to complex composition, great individual variety, and less regional variety.

Ans.   The last few lines of the passage have the answer: "Modern males exhibit *more individual diversity*, and *their calls are more complex*. While 50 years ago the drumming pattern was quite simple and the dialects denoted just a change in tempo, Casey explained, the calls recorded today have *more complex structures*".

Q.9    From the passage it can be inferred that the call pulse rate of male northern elephant seals in the southern rookeries was faster because:

A. a large number of male northern elephant seals migrated from the southern rookeries to Año Nuevo Island in the early 1970s.

B. the male northern elephant seals of Isla Guadalupe with faster call pulse rates might have been the original settlers of the southern rookeries.

C. the calls of male northern elephant seals in the southern rookeries have more sophisticated structures, containing doublets and triplets.

D. a large number of male northern elephant seals from Año Nuevo Island might have migrated to the southern rookeries to recolonise them.

Ans. Note the observation in paragraph 4: "At other sites, where the scientists found faster pulse rates, the opposite would have happened—seals with faster rates would have happened to arrive first

The passage below is accompanied by a set of questions. Choose the best answer to each question.

Few realise that the government of China, governing an empire of some 60 million people during the Tang dynasty (618–907), implemented a complex financial system that recognised grain, coins and textiles as money. . . . Coins did have certain advantages: they were durable, recognisable and provided a convenient medium of exchange, especially for smaller transactions. However, there were also disadvantages. A continuing shortage of copper meant that government mints could not produce enough coins for the entire empire, to the extent that for most of the dynasty's history, coins constituted only a tenth of the money supply. One of the main objections to calls for taxes to be paid in coin was that peasant producers who could weave cloth or grow grain – the other two major currencies of the Tang – would not be able to produce coins, and therefore would not be able to pay their taxes. . . .

As coins had advantages and disadvantages, so too did textiles. If in circulation for a long period of time, they could show signs of wear and tear. Stained, faded and torn bolts of textiles had less value than a brand new bolt. Furthermore, a full bolt had a particular value. If consumers cut textiles into smaller pieces to buy or sell something worth less than a full bolt, that, too, greatly lessened the value of the textiles. Unlike coins, textiles could not be used for small transactions; as [an official] noted, textiles could not "be exchanged by the foot and the inch" . . .

But textiles had some advantages over coins. For a start, textile production was widespread and there were fewer problems with the supply of textiles. For large transactions, textiles weighed less than their equivalent in coins since a string of coins . . . could weigh as much as 4 kg. Furthermore, the dimensions of a bolt of silk held remarkably steady from the third to the tenth century: 56 cm wide and 12 m long . . . The values of different textiles were also more stable than the fluctuating values of coins. . . .

The government also required the use of textiles for large transactions. Coins, on the other hand, were better suited for smaller transactions, and possibly, given the costs of transporting coins, for a more local usage. Grain, because it rotted easily, was not used nearly as much as coins and textiles, but taxpayers were required to pay grain to the government as a share of their annual tax obligations, and official salaries were expressed in weights of grain. . . .

In actuality, our own currency system today has some similarities even as it is changing in front of our eyes. . . . We have cash – coins for small transactions like paying for parking at a meter, and banknotes for other items; cheques and debit/credit cards for other, often larger, types of payments. At the same time, we are shifting to

electronic banking and making payments online. Some young people never use cash [and] do not know how to write a cheque . . .

Q.10   In the context of the passage, which one of the following can be inferred with regard to the use of currency during the Tang era?

A. Currency usage was similar to that of modern times.

B. Currency that deteriorated easily was not used for official work.

C. Copper coins were more valuable and durable than textiles.

D. Grains were the most used currency because of government requirements.

Ans  The last paragraph has the answer: "In actuality, our own currency system today has some similarities even as it is changing in front of our eyes..."

Hence, the answer is, "Currency usage was similar to that of modern times."

Q.11   According to the passage, the modern currency system shares all the following features with that of the Tang, EXCEPT that:

A. it uses different materials as currency.

B. its currencies fluctuate in value over time.

C. it uses different currencies for different situations.

D. it is undergoing transformation.

Ans : The last paragraph states that the modern currency system "is changing in front of our eyes" and describes the transformation taking place. According to the passage, both the modern currency system and that of Tang use different materials as currency, different currencies for different situations and the currencies fluctuate in value from time to time.

Hence, the answer is, "it is undergoing transformation.

Q.12   When discussing textiles as currency in the Tang period, the author uses the words "steady" and "stable" to indicate all of the following EXCEPT:

A. reliable supply.

B. reliable measurements.

C. reliable quality.

D. reliable transportation.

Ans : Note the context in which the author uses the given words in paragraph 3. The author touches upon the reliable supply, measurements and quality of textiles. Transportation is not mentioned.

Hence, the answer is, "reliable transportation."

Q.13　During the Tang period, which one of the following would not be an economically sound decision for a small purchase in the local market that is worth one-eighth of a bolt of cloth?

A. Cutting one-eighth of the fabric from a new bolt to pay the amount.

B. Making the payment with the appropriate weight of grain.

C. Using coins issued by the government to make the payment.

D. Paying with a faded bolt of cloth that has approximately the same value.

Ans : Note the context in which the author uses the given words in paragraph 3. The author touches upon the reliable supply, measurements and quality of textiles. Transportation is not mentioned.

Hence, the answer is, "Cutting one-eighth of the fabric from a new bolt to pay the amount."

The passage below is accompanied by a set of questions. Choose the best answer to each question.

Vocabulary used in speech or writing organizes itself in seven parts of speech (eight, if you count interjections such as Oh! and Gosh! and Fuhgeddaboudit!). Communication composed of these parts of speech must be organized by rules of grammar upon which we agree. When these rules break down, confusion and misunderstanding result. Bad grammar produces bad sentences. My favorite example from Strunk and White is this one: "As a mother of five, with another one on the way, my ironing board is always up."

Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence, since a sentence is, by definition, a group of words containing a subject (noun) and a predicate (verb); these strings of words begin with a capital letter, end with a period, and combine to make a complete thought which starts in the writer's head and then leaps to the reader's.

Must you write complete sentences each time, every time? Perish the thought. If your work consists only of fragments and floating clauses, the Grammar Police aren't going to come and take you away. Even William Strunk, that Mussolini of rhetoric, recognized the delicious pliability of language. "It is an old observation," he writes, "that the best writers sometimes disregard the rules of rhetoric." Yet he goes on to add this thought, which I urge you to consider: "Unless he is certain of doing well, [the writer] will probably do best to follow the rules."

The telling clause here is Unless he is certain of doing well. If you don't have a rudimentary grasp of how the parts of speech translate into coherent sentences, how can you be certain that you are doing well? How will you know if you're doing ill, for that matter? The answer, of course, is that you can't, you won't. One who does grasp the rudiments of grammar finds a comforting simplicity at its heart, where there need be only nouns, the words that name, and verbs, the words that act.

Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float. These are all perfect sentences. Many such thoughts make little rational sense, but even the stranger ones (Plums deify!) have a kind of poetic weight that's nice. The simplicity of noun-verb construction is useful— at the very least it can provide a safety net for your writing. Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric—all those restrictive and nonrestrictive clauses, those modifying phrases, those appositives and compound-complex sentences. If you start to freak out at the sight of such unmapped territory (unmapped by you, at least), just remind yourself that rocks explode, Jane transmits, mountains float, and plums deify. Grammar is . . . the pole you grab to get your thoughts up on their feet and walking.

Q.14  Which one of the following quotes best captures the main concern of the passage?

A. "Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence . . ."

B. "Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric . . ."

C. "The telling clause here is Unless he is certain of doing well."

D. "Bad grammar produces bad sentences."

Ans.  According to the passage, grammar is fundamental to language. When grammar rules break down, confusion results. So, the main concern of the passage is best expressed by the line "bad grammar produces bad sentences."

Options A and B are easily eliminated, as they are about specific aspects of grammar. Option C is close, as this is also one of the concerns of the author-- a person may not be able to judge if they are "doing well" in their use of language. But between C and D, D is more general and the better choice.

Q.15  Which one of the following statements, if false, could be seen as supporting the arguments in the passage?

A. An understanding of grammar helps a writer decide if she/he is writing well or not.

B. Perish the thought that complete sentences necessarily need nouns and verbs!

C. It has been observed that writers sometimes disregard the rules of rhetoric.

D. Regarding grammar, women writers tend to be more attentive to method and accuracy.

Ans.  Trickily worded question. One statement among the given ones, if false, supports the arguments of the passage. A better way to approach this question would be to find the statement, which, *if true, does not support the arguments* of the passage.

According to the passage, "Nouns and verbs are the two indispensable parts of writing." Option B, if true, states the exact opposite of what the passage says. So, B is the correct choice.

Note that options A, C and D, if true, support the arguments in the passage.

Q.16 All of the following statements can be inferred from the passage EXCEPT that:

A. the subject–predicate relation is the same as the noun–verb relation.

B. the primary purpose of grammar is to ensure that sentences remain simple.

C. sentences do not always have to be complete.

D. "Grammar Police" is a metaphor for critics who focus on linguistic rules.

Ans. Though the passage says that there is "comforting simplicity" at the heart of grammar, it does not imply that the purpose of grammar is to make *sentences* simple.

Statements A, C and D can be inferred from these references in passage: "...a sentence is, by definition, a group of words containing a subject (noun) and a predicate (verb)...", "Must you write complete sentences each time, every time? Perish the thought", and "If your work consists only of fragments and floating clauses, the Grammar Police aren't going to come and take you away."

Q.17 Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float." None of the following statements can be seen as similar EXCEPT :

A. A collection of people with the same sports equipment is a sports team.

B. Take an apple tree, plant it in a field, and you have an orchard.

C. A group of nouns arranged in a row becomes a sentence.

D. Take any vegetable, put some spices in it, and you have a dish.

Ans. "None of the statements is similar except..." can be understood as "only one statement is similar to...".

Of the given statements, A and C can be eliminated right away. Consider B. One apple tree in a field does not make an orchard. This is an exaggeration, while the given sentence is not. D, on the other hand, is similar to the given sentence.

Q.18 Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float." None of the following statements can be seen as similar EXCEPT:

A. A collection of people with the same sports equipment is a sports team.

B. Take an apple tree, plant it in a field, and you have an orchard.

C. A group of nouns arranged in a row becomes a sentence.

D. Take any vegetable, put some spices in it, and you have a dish.

Ans.   The author urges writers to follow the rules of grammar: "...I urge you to consider: 'Unless he is certain of doing well, [the writer] will probably do best to follow the rules.'"

So, the author is most likely to be supportive of a tool that helps writers with grammar rules.

Note that the author is not against the use of rhetoric or critical of grammar rules. So, options A, B and C are easily eliminated.

Q.19   The four sentences (labelled A, B, C, D) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

Ans.    Of the given sentences, C is the most general and hence the best opening statement. Sentence A, which is about the tensions between states in South East Asia adds to C. B talks about the threat China poses to South East Asian states and follows A. D sums up the paragraph.

A. Tensions and sometimes conflict remain an issue in and between the 11 states in South East Asia (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste and Vietnam). B. China's rise as a regional military power and its claims in the South China Sea have become an increasingly pressing security concern for many South East Asian states.

C. Since the 1990s, the security environment of South East Asia has seen both continuity and profound changes.

D. These concerns cause states from outside the region to take an active interest in South East Asian security.

Q.20   The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

For nearly a century most psychologists have embraced one view of intelligence. Individuals are born with more or less intelligence potential (I.Q.); this potential is heavily influenced by heredity and difcult to alter; experts in measurement

can determine a person's intelligence early in life, currently from paper-and-pencil measures, perhaps eventually from examining the brain in action or even scrutinizing his/her genome. Recently, criticism of this conventional wisdom has mounted. Biologists ask if speaking of a single entity called "intelligence" is coherent and question the validity of measures used to estimate heritability of a trait in humans, who, unlike plants or animals, are not conceived and bred under controlled conditions.

A. Biologists have questioned the long-standing view that 'intelligence' is a single entity and the attempts to estimate it's heritability.

B. Biologists have questioned the view that 'intelligence' is a single entity and the ways in which what is inherited.

C. Biologists have criticised that conventional wisdom that individuals are born with more or less intelligence potential.

D. Biologists have started questioning psychologists' view of 'intelligence' as a measurable immutable characteristic of an individual.

Ans. The last line of the paragraph states the main idea: Biologists ask if speaking of a single entity called "intelligence" is coherent and question the validity of measures used to estimate heritability of a trait in humans. Option A rephrases this.

The second half of option B is incorrect. The paragraph says biologists question the validity of measures used to estimate heritability, not the ways in which intelligence is inherited. Options C is not as comprehensive as A. Option D is incorrect as it says intelligence is 'immutable' while the paragraph only says it is difficult to alter.

Q.21 The four sentences (labelled A, B, C, D) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

A. Relying on narrative structure alone, indigenous significances of nineteenth century San folktales are hard to determine.

B. Using their supernatural potency, benign shamans transcend the levels of the San cosmos in order to deal with social conflict and to protect material resources and enjoy a measure of respect that sets them apart from ordinary people.
C. Selected tales reveal that they deal with a form of spiritual conflict that has social implications and concern conflict between people and living or dead malevolent shamans.

D. Meaning can be elicited, and the tales contextualized, by probing beneath the narrative of verbatim, original-language records and exploring the connotations of highly significant words and phrases.

Ans. Sentence A is the best opening sentence, as it tells us what the 'tales' mentioned in other sentences refer to -- nineteenth century San folktales. Sentence A states that the significance of these tales is "hard to determine". Sentence D tells us how the meaning

can be elicited. So, D follows A. Sentence B mentions "shamans"-- who/what these are is clear only from C.Shamans are dead and malevolent. So, C comes before B.

Q.22 The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

For years, movies and television series like Crime Scene Investigation (CSI) paint an unrealistic picture of the "science of voices." In the 1994 movie Clear and Present Danger an expert listens to a brief recorded utterance and declares that the speaker is "Cuban, aged 35 to 45, educated in the […] eastern United States." The recording is then fed to a supercomputer that matches the voice to that of a suspect, concluding that the probability of correct identification is 90%. This sequence sums up a good number of misimpressions about forensic phonetics, which have led to errors in real-life justice. Indeed, that movie scene exemplifies the so-called "CSI effect"—the phenomenon in which judges hold unrealistic expectations of the capabilities of forensic science.

A. Voice recognition has started to feature prominently in crime-scene intelligence investigations because of movies and television series.
B. Voice recognition as used in many movies to identify criminals has been used to identify criminals in real life also.
C. Although voice recognition is often presented as evidence in legal cases, its scientific basis can be shaky.
D. Movies and televisions have led to the belief that the use of forensic phonetics in legal investigations is robust and fool proof.

Ans : The main idea of the paragraph is conveyed in the last sentence: "Indeed, that movie scene exemplifies the so-called "CSI effect"—the phenomenon in which judges hold unrealistic expectations of the capabilities of forensic science." Option D rephrases this. Also note that all other option are specific to voice recognition. The paragraph is more general and talks of forensic science.

The answer is, "Movies and televisions have led to the belief that the use of forensic phonetics in legal investigations is robust and fool proof."

Q.23 The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

As Soviet power declined, the world became to some extent multipolar, and Europe strove to define an independent identity. What a journey Europe has undertaken to reach this point. It had in every century changed its internal structure and invented new ways of thinking about the nature of international order. Now at the culmination of an era, Europe, in order to participate in it, felt obliged to set aside the political mechanisms

through which it had conducted its affairs for three and a half centuries. Impelled also by the desire to cushion the emergent unification of Germany, the new European Union established a common currency in 2002 and a formal political structure in 2004. It proclaimed a Europe united, whole, and free, adjusting its differences by peaceful mechanisms.

A. Europe has consistently changed in keeping with the changing world order and that has culminated in a united Europe.

B. The establishment of a formal political structure in Europe was hastened by the unification of Germany and the emergence of a multipolar world.

C. Europe has consistently changed its internal structure to successfully adapt to the changing world order.

D. Europe has chosen to lower political and economic heterogeneity, in order to adapt itself to an emerging multi-polar world.

Ans.   The paragraph describes how Europe changed its internal structure and transformed itself into a united whole using peaceful mechanisms in the new multi-polar world. Option D captures all key ideas in the paragraph. The paragraph is specific to the time after Soviet decline and emergent unification of Germany-- a multi-polar world. Options A and C do not include this idea. The paragraph explains how Europe changed its internal structure by adjusting its differences by peaceful mechanisms. Option B does not include this.

Q.24   The four sentences (labelled A, B, C, D) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

A. Man has used poisons for assassination purposes ever since the dawn of civilization, against individual enemies but also occasionally against armies.
B. These dangers were soon recognized, and resulted in two international declarations—in 1874 in Brussels and in 1899 in The Hague—that prohibited the use of poisoned weapons.

C. The foundation of microbiology by Louis Pasteur and Robert Koch offered new prospects for those interested in biological weapons because it allowed agents to be chosen and designed on a rational basis.

D. Though treaties were all made in good faith, they contained no means of control, and so failed to prevent interested parties from developing and using biological weapons.

Ans.   Sentence A is the best opening sentence, as it sets the context. Sentence A talks of poisons used for assassination purposes. C adds to A explaining how the foundation of microbiology helped those interested in biological weapons. BD is a unit: 'these treaties' in D refers to the treaties mentioned in B. ACBD is hence the right order.

Q.25 Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

A. For feminists, the question of how we read is inextricably linked with the question of what we read.

B. Elaine Showalter's critique of the literary curriculum is exemplary of this work.
C. Androcentric literature structures the reading experience differently depending on the gender of the reader.

D. The documentation of this realization was one of the earliest tasks undertaken by feminist critics.

E. More specifically, the feminist inquiry into the activity of reading begins with the realization that the literary canon is androcentric, and that this has a profoundly damaging effect on women readers.

Ans. Tricky question. CE is a possible link, as both talk of androcentric literature. But while C talks about the 'reading experience' depending on the gender of the reader, E talks about the realization that the literary canon is androcentric. These are slightly different ideas.

ED is a strong link, as both talk about the feminists' realization. ED leads on to B, which talks about Elaine Showalter's critique of the literary curriculum. AE is also a strong link, as both sentences relate to the question of what women read.

Between AE and CE, AE is links better to the main idea of the paragraph-- the realization by feminists that what women read has a damaging effect on women readers. AEDB is a cogent paragraph. C is the sentence to be eliminated.

Q.26 Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

A. Talk was the most common way for enslaved men and women to subvert the rules of their bondage, to gain more agency than they were supposed to have.

B. Even in conditions of extreme violence and unfreedom, their words remained ubiquitous, ephemeral, irrepressible, and potentially transgressive.

C. Slaves came from societies in which oaths, orations, and invocations carried great potency, both between people and as a connection to the all-powerful spirit world.

D. Freedom of speech and the power to silence may have been preeminent markers of white liberty in Colonies, but at the same time, slavery depended on dialogue: slaves could never be completely muted.

E. Slave-owners obsessed over slave talk, though they could never control it, yet feared its power to bind and inspire—for, as everyone knew, oaths, whispers, and secret conversations bred conspiracy and revolt.

Ans. While all other sentences relate to slave talk, i.e conversations between slaves, C is different, as it is about the significance of oaths, orations and invocations in the societies slaves came from. DABE is a cogent paragraph.

## LRDI Section

## Directions(27-30)

The local office of the APP-CAB company evaluates the performance of five cab drivers, Arun, Barun, Chandan, Damodaran, and Eman for their monthly payment based on ratings in five different parameters (P1 to P5) as given below:

P1: timely arrival

P2: behaviour

P3: comfortable ride

P4: driver's familiarity with the route

P5: value for money

Based on feedback from the customers, the office assigns a rating from 1 to 5 in each of these parameters. Each rating is an integer from a low value of 1 to a high value of 5. The final rating of a driver is the average of his ratings in these five parameters. The monthly payment of the drivers has two parts – a fixed payment and final rating-based bonus. If a driver gets a rating of 1 in any of the parameters, he is not eligible to get bonus. To be eligible for bonus a driver also needs to get a rating of five in at least one of the parameters. The partial information related to the ratings of the drivers in different parameters and the monthly payment structure (in rupees) is given in the table below:

| | P1 | P2 | P3 | P4 | P5 | Fixed payment | Bonus |
|---|---|---|---|---|---|---|---|
| Arun | | | | 4 | | Rs.1000 | Rs.250 × Final Rating |
| Barun | 3 | | | | | Rs.1200 | Rs.200 × Final Rating |
| Chandan | | | 2 | | | Rs.1400 | Rs.100 × Final Rating |
| Damodaran | | 3 | | | | Rs.1300 | Rs.150 × Final Rating |
| Eman | | | | | 2 | Rs.1100 | Rs.200 × Final Rating |

The following additional facts are known.

1. Arun and Barun have got a rating of 5 in exactly one of the parameters. Chandan has got a rating of 5 in exactly two parameters.

2. None of drivers has got the same rating in three parameters.

Q.27 If Damodaran does not get a bonus, what is the maximum possible value of his final rating?

    1. 3.8
    2. 3.4
    3. 3.6
    4. 3.2

Ans. Damodaran not get a bonus .two possibilities either No 5 stars or atleast one 1st star To get

maximum final rating $\Rightarrow 5 + 5 + 3 + 4 + 1 = \dfrac{18}{5} = 3.6$

Option : 3

Q.28 If Eman gets a bonus, what is the minimum possible value of his final rating?

    1. 3.0
    2. 3.2
    3. 2.8
    4. 3.4

Ans. Eman got bonus (Atleast one -5 star) Minimum final rating

$\Rightarrow 5 + 2 + 2 + 3 + 3 = \dfrac{15}{5} = 3$

Q.29 If all five drivers get bonus, what is the minimum possible value of the monthly payment (in rupees) that a driver gets?

    1. 1740
    2. 1600
    3. 1700
    4. 1750

Ans.

$A \rightarrow 5 + 4 + 2 + 2 + 3 \Rightarrow \dfrac{16}{5} \Rightarrow 3 - 2 \times 250 \Rightarrow 800 + 1000 = 1800$

$B \rightarrow 5 + 3 + 2 + 2 + 3 \Rightarrow \dfrac{15}{5} \Rightarrow 3 \times 200 = 600 + 1200 = 1800$

$C \rightarrow 5 + 3 + 2 + 2 + 3 \Rightarrow \dfrac{17}{5} \Rightarrow 3 - 4 \times 100 \Rightarrow 340 \Rightarrow 1740 \,(340 + 1400)$

$D \rightarrow 5 + 3 + 2 + 2 + 3 \Rightarrow \dfrac{15}{5} \Rightarrow 3 \times 150 = 450 + 1300 \Rightarrow 1750$

$E \rightarrow 5 + 2 + 2 + 3 + 3 \Rightarrow \dfrac{15}{5} \Rightarrow 3 \times 200 = 600 + 1100 = 1700$

Minimum payment =1700

Option: 3

Q.30 If all five drivers get bonus, what is the maximum possible value of the monthly payment (in rupees) that a driver gets?

    1. 1960
    2. 1950
    3. 1900
    4. 2050

Ten musicians (A, B, C, D, E, F, G, H, I and J) are experts in at least one of the following three percussion instruments: tabla, mridangam, and ghatam. Among them, three are experts in tabla but not in mridangam or ghatam, another three are experts in mridangam but not in tabla or ghatam, and one is an expert in ghatam but not in tabla or mridangam. Further, two are experts in tabla and mridangam but not in ghatam, and one is an expert in tabla and ghatam but not in mridangam. The following facts are known about these ten musicians.

1. Both A and B are experts in mridangam, but only one of them is also an expert in tabla.
2. D is an expert in both tabla and ghatam.
3. Both F and G are experts in tabla, but only one of them is also an expert in mridangam.
4. Neither I nor J is an expert in tabla.
5. Neither H nor I is an expert in mridangam, but only one of them is an expert in ghatam.

Ans.   If all five drivers got bonus maximum possible would be

$A \rightarrow 5 + 4 + 4 + 3 + 3 \Rightarrow \dfrac{19}{5} \Rightarrow 3.8 \times 250 = 950 + 1000 = 1950$

$B \rightarrow 5 + 4 + 4 + 3 + 3 \Rightarrow \dfrac{19}{5} \Rightarrow 3.8 \times 200 = 760 + 1200 = 1960$

$C \rightarrow 5 + 5 + 4 + 4 + 2 \Rightarrow \dfrac{20}{5} = 4 \times 100 = 400 = 1400 = 1800$

$D \rightarrow 5 + 5 + 3 + 4 + 4 \Rightarrow \dfrac{21}{5} \Rightarrow 4.2 \times 150 = 630 + 1300 = 1930$

$E \rightarrow 5 + 5 + 4 + 4 + 2 \Rightarrow \dfrac{20}{5} = 4 \times 200 = 800 + 1100 = 1900$

Maximum monthly payment = 1960

Option: 1

Each of the ten musicians A, B, C, D, E, F, G, H, I & J is an expert in at least one of the percussion instruments.

3 are expert in only Tabla (T)

3 are expert in only Mridangam (M)

1 is expert in only Ghatam (G)

2 are expert in T & M but not G

1 is expert in T & G but Not on M

Total no of Musicians expert in T = 6

Total no of Musicians expert in M = 5

Total no of Musicians expert in G = 2

# Directions(31-34)

## Table – 1

| Musician | Percussion Instrument | | |
|---|---|---|---|
| | TABLA (T) | MRIDANGAM (M) | GHATAM (G) |
| A | (OR) ↕ | ✓ | × |
| B | | ✓ | × |
| C | | | |
| D | ✓ | × | ✓ |
| E | | | |
| F | ✓ | (OR) ↕ | |
| G | ✓ | | |
| H | | × | (OR) ↕ |
| I | × | × | |
| J | × | | |
| Total | 6 | 5 | 2 |

Since none of the musician who are expert in mridangam also expert in Ghatam. Hence A & B are not expert in Ghatam.

None of the musicians are expert in all 3 instruments, D is not expert in Mridangam. I has expertise in Ghatam because he is expert neither in Tabla n or Mridangam (From 4 and 5). Again since H is expert neither in Mridangam n or Ghatam, H is an expert in Tabla.

## Table – 2

| | Musician | TABLA(T) | MRIDANGAM(M) | GHATAM(G) |
|---|---|---|---|---|
| | | | Percussion Instrument | |
| | A | (OR) ↕ | ✓ | × |
| | B | | ✓ | × |
| Tabla (OR) | C | ? | | × |
| | D | ✓ | × (OR) | ✓ |
| | E | ? | | × |
| | F | ✓ | (OR) ↕ | × |
| | G | ✓ | | × |
| | H | ✓ | × | (OR) ↕ × |
| | I | × | × | ✓ |
| | J | × | ✓ | × |
| | Total | 6 | 5 | 2 |

Total number of musicians who are expert in tabla is six. Besides D, F, G & H, either A or B (from 1) and either C or E are experts in tabla.

Total number of musicians who are expert in ghatam is two. Since D & I are experts in Ghatam, others are not experts in Ghatam.

Now, J is expert neither in Tabla nor in Ghatam. Hence J is an expert in Mridangam. Total number of musicians who have expertise in Mridangam is five.
Those a re A, B, J and F or G, Hence out of C & E one has expertise in Mridangam.

Out of A & B one of the musicians is an expert of only Mridangam the other has the expertise in both table & Mridangam.

Out of F & G one of the musicians is an expert of only table &the other has the expertise in both table & Mridangam.

Out of C & E one of the musicians is an expert of Tabla only and the other is an expert of Mridangam only Alternate solutions:

The given information can be represented in the following Venn diagram
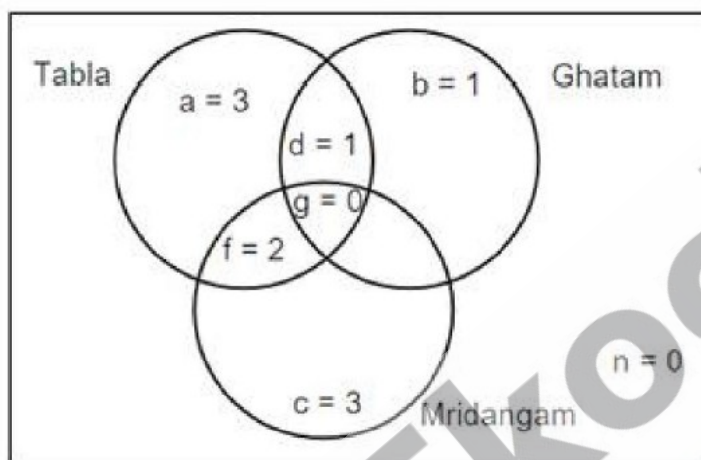


From (1), one of A and B will be in region c and the other one in region f.

From (2), D is in region d.

From (3), one of F and G will be in region a and the other one in f.

From (4), either both I and J will be in region c or one in region b and the other in region c.
From (5), one of H and I will be in region b and the other in region a.

By combining (4) and (5), I will be in region b, H in region a and J in region c.

Thus, we get the following.

Region a = 3 (F/G, H, C/E), Region b = 1 (I), Region c = 3 (A/B, J, C/E)

Region d = 1 (D), Region f = 2 (B/A, G/F)

Q.31 Who among the following is DEFINITELY an expert in tabla but not in either mridangam or ghatam?
    1. C
    2. H

3. A
4. F

Ans.    H definitely is an expert only in Tabla
Option: 2

Q.32    Who among the following is DEFINITELY an expert in mridangam but not in either tabla or ghatam?
1. B
2. G
3. J
4. E

Ans.    J definitely is an expert only in Mridangam
Option: 3

Q.33    Which of the following pairs CANNOT have any musician who is an expert in both tabla and mridangam but not in ghatam?
1. A and B
2. C and F
3. C and E
4. F and G

Ans.    One of A and B, one of G and F are experts in both tabla and mridangam but not ghatam. Three of the choices has at least one of the above four musicians. But one (C and E) does not have any one of these four. Hence, that is the answer

Option: 3

Q.34    If C is an expert in mridangam and F is not, then which are the three musicians who are experts in tabla but not in either mridangam or ghatam?
1. C, E and G
2. C, G and H
3. E, G and H
4. E, F and H

Four institutes, A, B, C, and D, had contracts with four vendors W, X, Y, and Z during the ten calendar years from 2010 to 2019. The contracts were either multi-year contracts running for several consecutive years or single-year contracts. No institute had more than one contract with the same vendor. However, in a calendar year, an institute may have had contracts with multiple vendors, and a vendor may have had contracts with multiple

institutes. It is known that over the decade, the institutes each got into two contracts with two of these vendors, and each vendor got into two contracts with two of these institutes.
The following facts are also known about these contracts.
    I.    Vendor Z had at least one contract in every year.
    II.    Vendor X had one or more contracts in every year up to 2015, but no contract in any year after that.
    III.    Vendor Y had contracts in 2010 and 2019. Vendor W had contracts only in 2012.
    IV.    There were five contracts in 2012.
    V.    There were exactly four multi-year contracts. Institute B had a 7-year contract, D had a 4- year contract, and A and C had one 3-year contract each. The other four contracts were single-year contracts.
    VI.    Institute C had one or more contracts in 2012 but did not have any contract in 2011.

VII. Institutes B and D each had exactly one contract in 2012. Institute D did not have any contract in 2010.

Ans. Given, C is an expert in mridangam but not F. It means F and E are experts only in tabla. Thus, E, F and H will be the experts in tabla but not in mridangam or ghatam.

Option: 4

### Directions(35-38)

Four institutes, A, B, C, and D, had contracts with four vendors W, X, Y, and Z during the ten calendar years from 2010 to 2019. The contracts were either multi-year contracts running for several consecutive years or single-year contracts. No institute had more than one contract with the same vendor. However, in a calendar year, an institute may have had contracts with multiple vendors, and a vendor may have had contracts with multiple institutes. It is known that over the decade, the institutes each got into two contracts with two of these vendors, and each vendor got into two contracts with two of these institutes.

The following facts are also known about these contracts.

I. Vendor Z had at least one contract in every year.

II. Vendor X had one or more contracts in every year up to 2015, but no contract in any year after that.

III. Vendor Y had contracts in 2010 and 2019. Vendor W had contracts only in 2012.
IV. There were five contracts in 2012.

V. There were exactly four multi-year contracts. Institute B had a 7-year contract, D had a 4-year contract, and A and C had one 3-year contract each. The other four contracts were single-year contracts.

VI. Institute C had one or more contracts in 2012 but did not have any contract in 2011.
VII. Institutes B and D each had exactly one contract in 2012. Institute D did not have any contract in 2010.

### Solutions(35-38)

Institutes A, B, C, D Vendors W, X, Y, Z

Contracts Awarded are multiyear Contracts (consecutive years) or single Year Contract.
No institute had more than one contract with the single vendor.
Each Institute ☐ Two contracts ☐ two vendors
Each Vendor ☐ two contracts ☐ two institutes
V. Exactly 4 multi year contract (A-3years, B-7 years, C-3 years, D-4 years). Exactly 4 single year contracts. In total 8 contracts.

I. Vendor Z had at least one contract in ever year. This is only possible if he had both the contracts which are multi years contract. As 7 + 1 = 8 not possible. Only possibility is (7years + 3 years) or (3 years + 7 years) = 10 years.

II. Vendor X □ Six years 2010, 2011, 2012, 2013, 2014, 2015. To have contract for theses six years, only possibility is left with multi years contracts (4 years + 3 years or 3 years + 4 years) with 1 year overlapping contract. PI. Note (3years + 3 years) is not possible for vendor X as one 3 years is already awarded to vendor Z{(7years + 3 years ) or (3 years + 7 years) = 10 years}.

So all the 4 multiyear contracts are awarded to Z (3 years, 7 years) & X (3 years, 4 years). So we are left with 4 single year contracts.

III. Vendor Y had contracts in 2010 & 2019. Both of these contracts are single year contracts. Vendor W had contracts (two contracts) only in year 2012. So both of these are single year contracts.

IV. There are 5 contracts in 2012.

VI. Institute C had one or more contracts in 2012, but no contract in 2011.

VII. Institute B & D each had exactly one contract in 2012. Institute D did not have any contract in 2010.

Out of 5 contracts in 2012 {B, D, W, W and C at least one contract). Hence C has exactly one contract in 2012.

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | 3 year |
| B | | | | | | | | | | | 7 year |
| C | | ✕ | | | | | | | | | 3 year |
| D | ✕ | | | | | | | | | | 4 year |
| | Y | | W, W, B, D, C | | | | | | | Y | |

For Vendor X, 4 year contract is with D. It Can vary from (2011-2014) or (20122015). No contract can be awarded to him after 2015 (point II). Only possibility for 3 year contract is with A only, as C do not have any contract in 2011. Therefore Vendor X has a 3 year contract with institute A from 2010-2012 & a 4 year contract with institute D from 2012 to 2015 (so as to have one or more contract from 2012 to 2015).

Vendor Z can be allotted contracts with only Institute B & C Only. As vendor Z has at least one contract in every year ( point I) , thus the only possibility left is first 7 year contract with institute B and then 3 year contract with institute C ( as institute C do not have any contract in 2011).

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | X - 3 years (2010-2012) | | | | | | | | | | 3 year |
| B | | | | | | | | | | | 7 year |
| C | | ✕ | | | | | | | | | 3 year |
| D | ✕ | | X - 4 years ( 2012-2015) | | | | | | | | 4 year |
| | Y | | W, W, B, D, C | | | | | | | Y | |

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | X - 3 years (2010-2012) | | | | | | | | | | 3 year |
| B | Z - 7 years ( 2010-2016) | | | | | | | | | | 7 year |
| C | | ✕ | | | | | | Z – 3 years ( 2017-2019) | | | 3 year |
| D | ✕ | | X - 4 years ( 2012-2015) | | | | | | | | 4 year |
| | Y | | W, W, B, D, C | | | | | | | Y | |

In 2012 there are 5 contracts. Three contracts are already assigned. Remaining two are single year contracts of W in 2012. Also Institute C has at least one contract in 2012. {No institute had more than one contract with the same vendor (initial condition)}. Hence both vendor W 1 years contract cannot be with Institute C. Hence Exactly one contract of vendor W is with institute C. Further, Point VII, Institutes B and D each had exactly one contract in 2012 which is already assigned. Hence second 1 year contract of vendor W is with institute A in 2012 (only possibility).

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | X - 3 years (2010-2012), | | | | | | | | | | 3 year |
| | | | W-1 year (2012) | | | | | | | | |
| B | | | Z - 7 years ( 2010-2016) | | | | | | | | 7 year |
| C | | | W-1 year (2012) | | | | | Z – 3 years ( 2017-2019) | | | 3 year |
| D | | | X - 4 years ( 2012-2015) | | | | | | | | 4 year |
| | Y | | W, W , B, D, C | | | | | | | Y | |

Institute A has allotted two contracts to 2 vendors {X & W}. Institute C had allotted contracts to two vendors {W & Z}. Hence Vendor Y can have a 1 year contract with only Institute B in 2010, (only possibility left). Hence vendor Y had 1 year contract in 2019 with Institute D (only possibility left).

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | X - 3 years (2010-2012), | | | | | | | | | | 3 year |
| | | | W-1 year (2012) | | | | | | | | |
| B | Y-1 year (2010) Z - 7 years ( 2010-2016) | | | | | | | | | | 7 year |
| C | | | W-1 year (2012) | | | | | Z – 3 years ( 2017-2019) | | | 3 year |
| D | | | X - 4 years ( 2012-2015) | | | | | | | Y-1 year (2019) | 4 year |
| | Y | | W, W , B, D, C | | | | | | | Y | |

Q.35   In which of the following years were there two or more contracts?
                    1. 2018
                    2. 2017
                    3. 2015
                    4. 2016
Ans.   In 2015 there were two contracts with vendor Z and X
       Option: 3

Q.36   Which of the following is true?
                    1. D had a contract with Y in 2019
                    2. D had a contract with X in 2011
                    3. B had a contract with Y in 2019
                    4. B had a contract with Z in 2017
Ans.   D had a contract with Y in 2019
       Option: 1

Q.37 In how many years during this period was there only one contract?
         1. 4
         2. 2
         3. 3
         4. 5

Ans. In three years {in 2016 (Z), 2017 (Z), 2018 (Z)} there were only one contract
Option: 3

Q.38 What BEST can be concluded about the number of contracts in 2010?
         1. exactly 4
         2. at least 4
         3. exactly 3
         4. at least 3

Ans. In 2010 {(A-X), (B-Z), (B-Y)} exactly three contracts.
Option: 3

Q.39 Which institutes had multiple contracts during the same year?
         1. B and C only
         2. A only
         3. B only
         4. A and B only

Ans. $A \rightarrow (X \ \& \ W)$ in 2012, $B \rightarrow (Z \ \& \ Y)$ in 2010
Option: 4

Q.40 Which institutes and vendors had more than one contracts in any year?
         1. A, D, W, and Z
         2. B, W, X, and Z
         3. B, D, W, and X
         4. A, B, W, and X

Ans. Institutes $\{A \rightarrow 2012, B \rightarrow 2010\}$, Vedors $\{W \rightarrow 2012 \ X \rightarrow 2012\}$
Option: 4

In a certain board examination, students were to appear for examination in five subjects: English, Hindi, Mathematics, Science and Social Science. Due to a certain emergency situation, a few of the examinations could not be conducted for some students. Hence, some students missed one examination and some others missed two examinations. Nobody missed more than two examinations.

The board adopted the following policy for awarding marks to students. If a student appeared in all five examinations, then the marks awarded in each of the examinations were on the basis of the scores obtained by them in those examinations.

If a student missed only one examination, then the marks awarded in that examination was the average of the best three among the four scores in the examinations they appeared for.

If a student missed two examinations, then the marks awarded in each of these examinations was the average of the best two among the three scores in the examinations they appeared for.

The marks obtained by six students in the examination are given in the table below. Each of them missed either one or two examinations.

|  | English | Hindi | Mathematics | Science | Social Science |
|---|---|---|---|---|---|
| Alva | 80 | 75 | 70 | 75 | 60 |
| Bithi | 90 | 80 | 55 | 85 | 85 |
| Carl | 75 | 80 | 90 | 100 | 90 |
| Deep | 70 | 90 | 100 | 90 | 80 |
| Esha | 80 | 85 | 95 | 60 | 55 |
| Foni | 83 | 72 | 78 | 88 | 83 |

The following facts are also known.
   I.   Four of these students appeared in each of the English, Hindi, Science, and Social Science examinations.
   II.  The student who missed the Mathematics examination did not miss any other examination.
   III. One of the students who missed the Hindi examination did not miss any other examination. The other student who missed the Hindi examination also missed the Science examination.

Q.41  Who among the following did not appear for the Mathematics examination?
   1. Foni
   2. Alva
   3. Esha
   4. Carl

Q.42  Which students did not appear for the English examination?
   1. Alva and Bithi
   2. Carl and Deep
   3. Esha and Foni
   4. Cannot be determined

Q.43  What BEST can be concluded about the students who did not appear for the Hindi examination?

   1. Alva and Deep
   2. Deep and Esha
   3. Alva and Esha
   4. Two among Alva, Deep and Esha

Q.44    What BEST can be concluded about the students who missed the Science examination?

1. Alva and Bithi
2. Deep and Bithi
3. Alva and Deep
4. Bithi and one out of Alva and Deep

Q.45    How many out of these six students missed exactly one examination?

Q.46    For how many students can we be definite about which examinations they missed?

1000 patients currently suffering from a disease were selected to study the effectiveness of treatment of four types of medicines — A, B, C and D. These patients were first randomly assigned into two groups of equal size, called treatment group and control group. The patients in the control group were not treated with any of these medicines; instead they were given a dummy medicine, called placebo, containing only sugar and starch. The following information is known about the patients in the treatment group.

a. A total of 250 patients were treated with type A medicine and a total of 210 patients were treated with type C medicine.
b. 25 patients were treated with type A medicine only. 20 patients were treated with type C medicine only. 10 patients were treated with type D medicine only.
c. 35 patients were treated with type A and type D medicines only. 20 patients were treated with type A and type B medicines only. 30 patients were treated with type A and type C medicines only. 20 patients were treated with type C and type D medicines only.
d. 100 patients were treated with exactly three types of medicines.
e. 40 patients were treated with medicines of types A, B and C, but not with medicines of type D. 20 patients were treated with medicines of types A, C and D, but not with medicines of type B.
f. 50 patients were given all the four types of medicines. 75 patients were treated with exactly one type of medicine

# Solutions (41-46)

From the fourth paragraph, it is very clear that if the student miss exactly two exams, them his / her marks in those two subjects would be the average of best two scores and would also be "EQUAL"

By properly analysing the table, we can conclude that Esha is the only student who do not score equal marks in any two subjects. Hence, Esha is one of the student who missed exactly one subject.

Marks obtained by the student in the missed examination is the average of Best three scores, and the average/mean cannot be lowest or highest value.

Considering this concept of averages, Isha can miss examination of English, Hindi or Science. If Esha missed English Exam, then her marks in that exam would be $\dfrac{95+85+60}{3}$ or 80.

Eventually she scored 80 only in English. Hence Esha could miss examination of English If Esha missed Hindi Exam, then her marks would be $\dfrac{95+85+60}{3}$ or 60. This contradicts with value given the table if Esha missed science Exam, then her marks in science exam would be $\dfrac{80+85+95}{3}$ In conclusion, Esha missed the exam of exactly subject that is English From the second fact, we can infer that one of student missed exam of only Mathematics.

If Alva missed Maths exam, then her scored would be $\dfrac{80+75+75}{3}=76.66$ This value contradicts with value given the table Hence Alva did not miss the Math Exam If Bithi missed the Maths Exam, then her score would not be the lowest score (55)

If Carl missed the Maths exam, then his score would be $\dfrac{80+100+90}{3}$ o r 270 Carl could be the student who missed the maths exam.

If Deep missed the Maths exam then he can't score the highest marks of 100

If Foni missed the Maths exam then her score in that exam would be $\dfrac{83+88+83}{3}$ Or 84.6.

This contradicts with value given in the table. In conclusion, Carl is the student who missed the exam of only mathematics.

From the third fact, we can conclude that one student missed only Hindi exam. Another student missed two exams one Hindi and one more. Two students among Alva, Bithi, Deep and Foni would be in this category.

If Alva missed only Hindi exam, then her score would be $\dfrac{80+70+75}{3}$ or 75 marks score. If Alva missed two exams, then her score in both the exam would be equal.

Alva can miss Hindi and science, and her score in both these exam in the average of $\dfrac{80+70}{2}=75$ marks scored In conclusion, Alva can miss only Hindi exam or Hindi and science both If Bithi missed Hindi exam, then the score would be 90+85+85 or 86.6. The contradicts with value in the table

If Deep missed Hindi exam, then his score would be $\dfrac{100+90+80}{3}$ or 90. Makes score

If Deep missed Hindi and science, then his score would be $\dfrac{100+80}{2}$ or 90. Again marks score

In conclusion Deep missed the exam of only Hindi or Hindi and science If Foni missed Hindi, then her score would be $\dfrac{83+88+83}{3}=87.66$. This contradicts with value of given that table

After analysing the third fact, we can conclude that one among Alwa and deep missed only Hindi and the other missed Hindi and science.

So far we have analysed missed exams as Alwa, Carl. Deep and Foni.

Only Bithi and Foni left

From the first fact, we can conclude that

Exactly two students missed English exam.

Exactly two students missed Hindi exam.

Exactly two students missed Science and Exactly two students missed Social, Science Social Science was missed by two students and those 2 students must be Bithi and Foni We need to make sure apart from Esha, one more student missed English exam. Between Bithi and Foni, the scores are equal in Social score and English. In conclusion, Foni missed the exams of English and Social.

We also need to make sure apart from Alva or Deep, one more student missed Science exam and the only possibility is Bithi.

Alwa $\rightarrow$ Only Hindi or Hindi + Science

Bithi $\rightarrow$ Science and Social Science

Carl $\rightarrow$ Only mathematics

Deep $\rightarrow$ Only Hindi or Hindi and Science

Foni $\rightarrow$ English and social science

Q.41

Answer: 4

Q.42

Answer: 3

Q.43

Answer: 1

Q.44

Answer: 4

Q.45

Answer: 3

Q.46

Answer: 4

# Directions(47-50)

1000 patients currently suffering from a disease were selected to study the effectiveness of treatment of four types of medicines — A, B, C and D. These patients were first randomly assigned into two groups of equal size, called treatment group and control group. The patients in the control group were not treated with any of these medicines; instead they were given a dummy medicine, called placebo, containing only sugar and starch. The following information is known about the patients in the treatment group.

a. A total of 250 patients were treated with type A medicine and a total of 210 patients were treated with type C medicine.

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d. 100 patients were treated with exactly three types of medicines.

e. 40 patients were treated with medicines of types A, B and C, but not with medicines of type D. 20 patients were treated with medicines of types A, C and D, but not with medicines of type B.

f. 50 patients were given all the four types of medicines. 75 patients were treated with exactly one type of medicine

Q.47   How many patients were treated with medicine type B?

Q.48   The number of patients who were treated with medicine types B, C and D, but not type A was:

Q.49   How many patients were treated with medicine types B and D only?

Q. 50  The number of patients who were treated with medicine type D was:

## Solutions(47-50)

1000 patients are equally distributed into two groups treatment group and control group.
We have some information regarding the effectiveness of medicines A, B, C and D on the treatment group. Let us start filling the data give in the restrictions in a four sets Venn diagram.
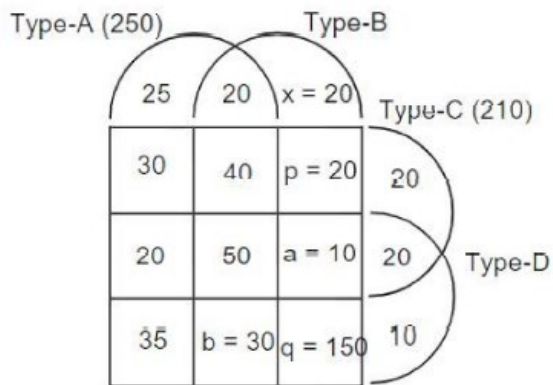
75 patients were treated exactly one type of medicine.

$\therefore 25 + x + 20 + 10 = 75$

$\Rightarrow x = 20$

We have only one unknown in type-A medicine. $220 + b = 250 \Rightarrow b = 30$

100 patients were treated with exactly three types of medicines. $40 + 20 + 30 + a = 100$

$\Rightarrow a = 10$

Now, we have only one unknown in each of the type C and type-D.

Q.47

Answer: 340

Q.48

Answer: 10

Q.49

Answer: 150

Q. 50

Answer: 325

**QA**

Q.51   How many 3-digit numbers are there, for which the product of their digits is more than 2 but less than 7?

Ans.

The product of the digits of the three-digit numbers should be more than 2 and less than 7 .Hence the possible numbers are as follows.

| Product | 3 | 5 | 4 | 6 |
|---------|---|---|---|---|
| Possibilities | (113, 131, 311) | (115, 151, 511) | (122, 212, 221) | (123, 132, 231) |
| | | | (114, 141, 411) | (116, 161, 611) |
| | | | | (213, 321, 312) |

Hence there are a total of 21 possibilities.

[Answer: 21]

Q.52 Veeru invested Rs 10000 at 5% simple annual interest, and exactly after two years, Joy invested Rs 8000 at 10% simple annual interest. How many years after Veeru's investment, will their balances, i.e., principal plus accumulated interest, be equal?

Ans.

Let after n years both the sums amount to the equal amounts.

Then, $1000\left(1+\dfrac{5\times(n+2)}{100}\right) = 800\left(1+\dfrac{10\times n}{100}\right)$

i.e., $1.5 = \dfrac{15n}{100} \Rightarrow n = 10$

Hence 12 years after veeru invested their balances will be equal

[Answer: 12]

Q.53 An alloy is prepared by mixing three metals A, B and C in the proportion 3: 4: 7 by volume. Weights of the same volume of the metals A, B and C are in the ratio 5: 2: 6. In 130 kg of the alloy, the weight, in kg, of the metal C is
   1. 70
   2. 96
   3. 48
   4. 84

Ans.

Required weight of $C = \left(\dfrac{7\times 6}{3\times 5 + 4\times 2 + 7\times 6}\right)\times 130 = 84$ kg

Option: 4]

Q.54 On a rectangular metal sheet of area 135 sq in, a circle is painted such that the circle touches two opposite sides. If the area of the sheet left unpainted is two-thirds of the painted area then the perimeter of the rectangle in inches is

$5\sqrt{\pi}\left(3+\dfrac{9}{\pi}\right)$

$3\sqrt{\pi}\left(\dfrac{5}{2}+\dfrac{6}{\pi}\right)$

$3\sqrt{\pi}\left(5+\dfrac{12}{\pi}\right)$

$$4\sqrt{\pi}\left(3+\frac{9}{\pi}\right)$$

Ans.

Let the length and the breadth of the rectangle be l and b respectively.
As the circle touches the two opposite sides, its diameter will be same as the breadth of the

rectangle. Given, $lb = 135$ and $lb = \pi\left(b/2\right)^2 = \frac{2}{3}\times\pi\left(b/2\right)^2$

$$\Rightarrow \frac{5}{3}\,\pi\left(\frac{b^2}{4}\right) = 135 \Rightarrow b = \frac{18}{\sqrt{\pi}}$$

From this $l = \dfrac{15\sqrt{\pi}}{2}$

∴   Required perimeter :

$$2\left(l+b\right) = 2\left[\frac{15\sqrt{\pi}}{2}+\frac{18}{\sqrt{\pi}}\right] = 3\sqrt{\pi}\left[\frac{5}{2}+\frac{6}{\pi}\right]$$

[Option: 2]

Q.55   If $\log_4 5 = \left(\log_4 y\right)\left(\log_6 \sqrt{5}\right)$, then y equals

Ans.

$$\log_4 5 = \left(\log_4 y\right)\left(\log_6 \sqrt{5}\right)$$

$$\Rightarrow \frac{\log_4 5}{\log_6 \sqrt{5}} = \log_4 y$$

$$\Rightarrow \log_4 5 \times \log_6 \sqrt{5} = \log_6 y$$

$$\Rightarrow 2\left(\log_4 5\right)\left(\log_5 6\right) = \left(\log_4 y\right)$$

$$\Rightarrow 2\log_4 6 = \log_4 y$$

$$\Rightarrow \log_4 6^2 = \log_4 y$$

$$\Rightarrow \log_4 36 = \log_4 y$$

$$\Rightarrow y = 36$$

[Answer :36]

Q.56   Two persons are walking beside a railway track at respective speeds of 2 and 4 km per hour in the same direction. A train came from behind them and crossed them in 90 and 100 seconds, respectively. The time, in seconds, taken by the train to cross an electric post is nearest to

Ans.   Let the length of the train be l and its speed be s. Given $\dfrac{l}{(s-2)\times\dfrac{5}{18}} = 90$ ; $\dfrac{l}{(s-4)\times\dfrac{5}{18}} = 100$

$$\Rightarrow 90\,(s-2)\times\frac{5}{18}=100(s-4)\times\frac{5}{18}\Rightarrow s=2$$

$\therefore$      Length of the train =500 m.

Hence the required time to cross a lamp post $\dfrac{500}{22\times\dfrac{5}{18}}$

i.e., 81.81 (or) 82 sec.

[Option: 2]

Q.57   The number of real-valued solutions of the equation $2^x+2^{-x}=2-(x-2)^2$ is

     1. infinite

     2. 1

     3. 0

     4. 2

Ans.

$$2^x+2^{-x}=2-(x-2)^2$$

The minimum value of $2^x+2^{-x}$ is when $x=0$

But $x=0$ ; $2-(x-2)^2=-2$

The maximum value of $2-(x-2)^2$ is 2 when $x-2$

But $x=2$ $2^x+2^{-x}=\dfrac{17}{4}$

Hence there is no value of $x$, $2^x+2^{-x}=2-(x-2)^2$

The number of solutions is 0

[Option: 3]

Q.58   If y is a negative number such that $2^{y^2\log_3 5}=2^{\log_3 5}$ , then y equals

     1. $\log_2(1/3)$

     2. $-\log_2(1/3)$

     3. $\log_2(1/5)$

     4. $-\log_2(1/5)$

Ans.
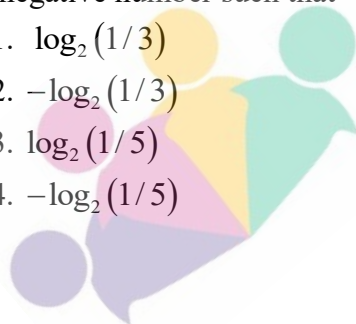
$$2^{y^2 \log_3 5} = 5^{\log_2 3}$$

$$\left(2^{\log_3 5}\right)^{y^2} = 5^{\log_2 3}$$

$$\left(5^{\log_3 2}\right)^{y^2} = 5^{\log_2 3}$$

$$5^{y^2 \log_3 2} = 5^{\log_2 3}$$

$$\Rightarrow y^2 \log_3 2 = \log_2 3$$

$$y^2 = \left(\log_2 3\right)\left(\log_2 3\right)$$

is negative )

$$y = \log_2 3^{-1} = \log_2 \frac{1}{3}$$

[Option: 1]

Q.59  How many distinct positive integer-valued solutions exist to the equation
$\left(x^2 - 7x + 11\right)^{\left(x^2 - 13x + 42\right)} = 1$ ?

     1.  6
     2.  8
     3.  2
     4.  4

Ans.

$$\left(x^2 - 7x + 11\right)^{\left(x^2 - 13x + 42\right)} = 1$$

We know if $a^b = 1$

$\Rightarrow a = 1$ and b is any number

Or $a = -1$ and b is even

$a > 0$ and b is 0

case 1 : $x^2 - 13x + 42 = 0 \Rightarrow x = 6.7$

case 2 : $x^2 - 7x + 11 = 1 \Rightarrow x^2 - 7x + 10 = 0 \Rightarrow x = 2 \ or \ 5$

case 3 : $x^2 - 7x + 11 = -1 \Rightarrow x^2 - 7x + 12 = 0$

$\Rightarrow x = 4 \ or \ 3$

Q.60  A person spent Rs 50000 to purchase a desktop computer and a laptop computer. He sold the desktop at 20% profit and the laptop at 10% loss. If overall he made a 2% profit then the purchase price, in rupees, of the desktop is

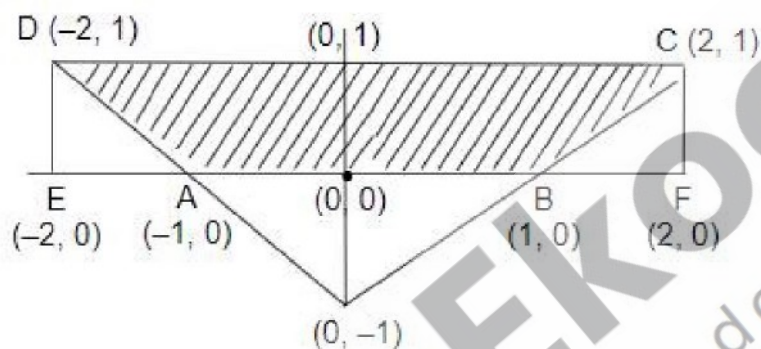Ans.  Using Alligation Rule, the ratio of cost prices of desktop and laptop will be
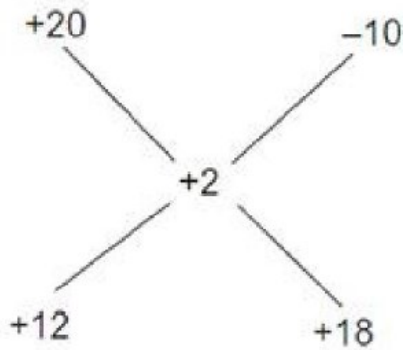
i.e., 2: 3

∴ The cost of desktop $= \dfrac{2}{5} \times 50000$ i.e., ₹ 20,000

[Answer: 20000]

Q. 61 The area of the region satisfying the inequalities $|x| - y \le 1,\ y \ge 0$ and $y \le 1$ is

Ans.

The graph of $|x| - y \le 1$ ; $y \ge 0$ and $y \le 1$ is follows :



Area of ABCD ☐ Area of EFCD - Area of EAD - Area of BFC

$$= \text{EF} \times \text{FC} - \dfrac{1}{2} \times \text{EA} \times \text{ED} - \dfrac{1}{2} \times \text{BF} \times \text{FC}$$

$$= 4 \times 1 - \dfrac{1}{2} \times 1 \times 1 - \dfrac{1}{2} \times 1 \times 1$$

$$= 4 - 1 = 3 \text{ Square units}$$

[Answer : 3]

Q. 62 A straight road connects points A and B. Car 1 travels from A to B and Car 2 travels from B to A, both leaving at the same time. After meeting each other, they take 45 minutes and 20 minutes, respectively, to complete their journeys. If Car 1 travels at the speed of 60 km/hr, then the speed of Car 2, in km/hr, is
1. 90
2. 100
3. 80
4. 70

Ans.

In this particular case, we know Ratio of speeds $= \sqrt{\text{Inverse ratio of times taken}}$

$C_1 : C_2 = \sqrt{20 : 45}$ i.e., 2:3

As the speed of Car $C_1$ is 60 kmph, the speed of Car $C_2$ is 90 kmph

[Option: 1]

Q.63 Among 100 students, $x_1$ have birthdays in January, $x_2$ have birthdays in February, and so on. If $x_0 = \max(x_1, x_2, ....x_{12})$, then the smallest possible value of $x_0$ is
1. 9
2. 10
3. 8
4. 12

Ans.

Given $x_0 = (x_1 \ x_2 \ ..........x_{12})$

If $x_1 = x_2 = x_3 = x_4 = 9$ ; $x_5 = x_6 = .......×_{12} = 8$

$\therefore \ x_0 = \max(9,9,9,9,8,8.....8)$

The minimum value if $x_0$ is 9 .

[Option: 1]

Q.64 The mean of all 4 -digit even natural numbers of the form 'aabb', where a >0, is
1. 5050
2. 4466
3. 5544
4. 4864

Ans. The sum of possible even digit numbers in the form aabb is
1100 +1122 +1144 +1166 +1188 + 2200 + 2222 + 2288 +.....9900 + 9922 + 9988
i.e. (45 numbers)
$\Rightarrow$ 1100+1100+1100+1100+1100+22+44+66+88+2200+2200+2200+2200+2200
+22+44+66+88+…+9900+9900+9900+990+9900+22+44+66+88
$\Rightarrow$ 5(1100 + 2200 +....9900) + 9(22 + 44 + 66 + 88)5×1100(1+ 2 +… … 9) + 9×22
(1+ 2 + 3 + 4)
$\Rightarrow$ 5500(45) + 45 × 44 = 45(5544)
Hence mean =5544
[Option: 3]

Q.65 Leaving home at the same time, Amal reaches office at 10: 15 am if he travels at 8 km/hr, and at 9: 40 am if he travels at 15 km/hr. Leaving home at 9: 10 am, at what speed, in km/hr, must he travel so as to reach office exactly at 10 am ?
1. 13
2. 14
3. 12
4. 11

Ans. Let the speed in the first two cases be s and the distance be "d". Given,

$$\frac{d}{8} - \frac{d}{15} = \frac{35}{60} \Rightarrow d = 10 \text{ km}$$

Required speed = $\dfrac{10}{\frac{50}{60}}$ = 12 kmph

[Option: 3]

Q.66 A train travelled at one-thirds of its usual speed, and hence reached the destination 30 minutes after the scheduled time. On its return journey, the train initially travelled at its usual speed for 5 minutes but then stopped for 4 minutes for an emergency. The percentage by which the train must now increase its usual speed so as to reach the destination at the scheduled time, is nearest to
1. 58
2. 67
3. 61
4. 50

Ans. Let the usual speed of the train be s and time taken at that speed be 't'.
Given by travelling at s/3, it reached 30 min late. Hence the usual time:
Distance travelled = $s \times t$

Distance travelled in the first $5 \min = s \times t / 3$. D

Distance to be travelled in the last $6 \min = 2st/3$

Required speed to cover that distance on time = $\dfrac{2st/3}{2st/5}$ i.e., $\dfrac{5x}{3}$

Hence the percentage increase in its speed = $(2/3) \times 100$ i.e., $66\frac{2}{3}$ % or 67 %

[Option: 2]

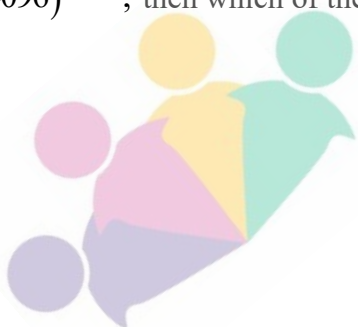Q.67 If $x = (4096)^{7+4\sqrt{3}}$, then which of the following equals 64 ?

1. $\dfrac{x^7}{x^{2\sqrt{3}}}$

2. $\dfrac{x^7}{x^{4\sqrt{3}}}$

3. $\dfrac{x^{\frac{7}{2}}}{x^{\frac{4}{\sqrt{3}}}}$

4. $\dfrac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$

Ans.

$$x = \left(4096\right)^{7+4\sqrt{3}}$$

$$x^{\frac{1}{7+4\sqrt{3}}} = \left(4096\right)$$

on ralationzing $7+4\sqrt{3}$, we get $\dfrac{1}{7+4\sqrt{3}} = 7-4\sqrt{3}$

$$\therefore \ x^{7-4\sqrt{3}} = \left(64\right)^2$$

$$\therefore 64 = x^{\frac{7-4\sqrt{3}}{2}}$$

$$64 = \dfrac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$$

Q.68 If $f\left(5+x\right) = f\left(5-x\right)$ for every real x, and f(x)=0 has four distinct real roots, then the sum of these roots is
1. 0
2. 40
3. 10
4. 20

Ans.

Given $\mathrm{f}\left(5+x\right) = f\left(5-x\right)$

Put $x = x - 5$

$$f\left(x\right) = f\left(10-x\right)$$

$\therefore$ Let a, b be two roots of $\mathrm{f}\left(x\right) = 0$ *then* $10-a, 10-b$ are also roots of $\mathrm{f}\left(x\right) = 0$

$\therefore$ Hence sum of the roots $= a + b + 10 - a + 10 - b = 20$

[Option: 4]

Q.69 If a, b and c are positive integers such that ab = 432, bc = 96 and c < 9, then the smallest possible value of a + b + c is
1. 56
2. 59
3. 49
4. 46

Ans.

Given $ab = 432, bc = 96$ and $c < 9$

To find the minimum value for $a + b + c$, the two larger numbers should be as close as possible.

The closest combination whose product is 432 is $18 \times 24$. For $b = 24$, we get $c = 4$ and $a = 18$.

Hence the least value for $a + b + c = 46$.

[Option: 4]

Q.70 In a group of people, 28% of the members are young while the rest are old. If 65% of the members are literates, and 25% of the literates are young, then the percentage of old people among the illiterates is nearest to
1. 62

2. 55
3. 66
4. 59

Ans. Let the number of persons in the group be 100 .

Then the people who are young $= 28$

Ans the number of literate persons $= 65$
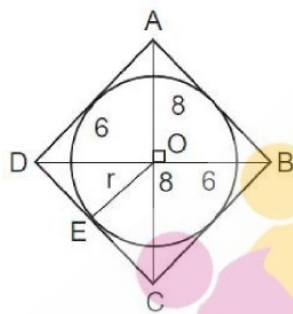
Number of literates who are young $= 25\%$ of $65 = 16.25$

$\therefore$ Required answer $\dfrac{48.75}{72} \times 100 = 66$

[Option: 3]

Q.71 A circle is inscribed in a thombus with diagonals 12 cm and 16 cm. The ratio of the area of circle to the area of rhombus is

1. $\dfrac{5\pi}{18}$

2. $\dfrac{6\pi}{25}$

3. $\dfrac{3\pi}{25}$

4. $\dfrac{2\pi}{15}$

Ans.



Given the circle is inscribed in the rhombus of diagonals 12 and 16 . Let O be the point of intersection of the diagonals of the rhombus. Then, OE (radius) $\perp$ DC.

Also $DC = \sqrt{6^2 + 8^2} = 10$

As area of $\Delta$ ODC should be the same, we have, $\dfrac{1}{2} \times 6 \times 8 = \dfrac{1}{2} \times OE \times 10$

$\Rightarrow OE = 4.8$

$\therefore$ Required ratio of areas $= \dfrac{\pi(4.8)^2}{\dfrac{1}{2} \times 12 \times 16} = \dfrac{6\pi}{25}$

[Option: 2]

Q.72 A gentleman decided to treat a few children in the following manner. He gives half of his total stock of toffees and one extra to the first child, and then the half of the remaining stock along with one extra to the second and continues giving away in this fashion. His total stock exhausts after he takes care of 5 children. How many toffees were there in his stock initially?

Ans. Given that the person is left with no toffees after distributing them to the fifth student.

Also given that to each student the person gave one more than half the number of toffees at that stage.

For these types of problems, better we go for backward calculation. If the person had not given 1 extra toffee, he would have left with that toffee.

This represents that he had 2 toffees at that stage. In the previous stage i.e in 4$^{th}$ stage he should have $(2 + 1) \times 2$ i.e 6 toffees In the third stage, he should have $(6 + 1) \times 2$ toffees.

In the second stage, he should have $(14 + 1) \times 2$ i.e 30 toffees. In the first stage, he should have $(30 + 1) \times 2$ i.e 62 toffees. Hence he initially had 62 toffees.
[Answer: 62]

Q.73 Let A, B and C be three positive integers such that the sum of A and the mean of B and C is 5. In addition, the sum of B and the mean of A and C is 7. Then the sum of A and B is
1. 6
2. 5
3. 7
4. 4

Ans.

Given A, B and C are positive integers such that $A + \dfrac{B + C}{2} = 5$ ....(1)

$B + \dfrac{A + C}{2} = 7$ ....(2)

$(2) - (1) \Rightarrow \dfrac{B}{2} - \dfrac{A}{2} = 2 \Rightarrow B - A = 4$

The least value for A=1 in which case B=5.
Hence $A + B = 6$
[Option: 1]

Q.74 A solution, of volume 40 litres, has dye and water in the proportion 2 : 3. Water is added to the solution to change this proportion to 2 : 5. If one-fourths of this diluted solution is taken out, how many litres of dye must be added to the remaining solution to bring the proportion back to 2 : 3?

Ans. Original quantity of dye and water in the original solution i.e., 16 litres $\left( \text{i.e.} = 40 \times \dfrac{2}{5} \right)$ and 24

litres $\quad (\text{i.e.} = 40 - 16)$

Quantity of water added = 16 litres (As 1 part = 8 litres). Quantity of dye and water removed $= \frac{1}{4} \times \frac{2}{7}(56)$ litres and $\frac{1}{4} \times \frac{5}{7} \times (56)$ i.e., 10 litres. Final quantity of dye and water is 12 litres and 30 litres.

∴ Quantity of dye to be added to make the ratio of dye and water again 2: 3 i.e., 8 litres.

[Answer: 8]

Q.75 The number of distinct real roots of the equation $\left(x + \frac{1}{x}\right)^2 - 3\left(x - \frac{1}{x}\right) + 2 = 0$ equals

Ans. Let $x + \frac{1}{x} = a$

The given equation becomes,

$a^2 - 3a + 2 = 0$ $a = 2$ or $1$ i.e. $x + \frac{1}{x} = 2$ or $x + \frac{1}{x} = 1$

since x is real, $x + \frac{1}{x} \neq 1$ ; $\therefore x + \frac{1}{x} = 2$

∴ The number of solutions = 1

[Answer: 1]

Q.76 A solid right circular cone of height 27 cm is cut into two pieces along a plane parallel to its base at a height of 18 cm from the base. If the difference in volume of the two pieces is 225 cc, the volume, in cc, of the original cone is
1. 232
2. 256
3. 264
4. 243

Ans. As the cone is cut at one-third height from the top (the vertex), the total volume is proportional to the cubes of the heights of the two parts.

Ratio of volumes two parts $\left(\frac{1}{3}\right)^3 : 1^3 = 1 : 27$

Hence the bottom part will have volume of $27 - 1$ i.e., 26 parts.
Given $(26 - 1)$ i.e. 25 parts -225 cc

Hence the required answer is 27 parts $= \frac{27 \times 225}{25} = 243$ cc.

[Option: 4]

Answer Key

| | | | |
|---|---|---|---|
| 1. 3 | 21. 3124 | 41. 4 | 61. 3 |
| 2. 1 | 22. 4 | 42. 3 | 62. 1 |
| 3. 3 | 23. 2 | 43. 1 | 63. 1 |
| 4. 3 | 24. 1 | 44. 4 | 64. 3 |
| 5. 4 | 25. 3 | 45. 3 | 65. 3 |
| 6. 4 | 26. 1324 | 46. 4 | 66. 2 |
| 7. 1 | 27. 3 | 47. 340 | 67. 4 |
| 8. 1 | 28. 1 | 48. 10 | 68. 4 |
| 9. 2 | 29. 3 | 49. 150 | 69. 4 |
| 10. 2 | 30. 1 | 50. 325 | 70. 3 |
| 11. 3 | 31. 2 | 51. 21 | 71. 2 |
| 12. 1 | 32. 3 | 52. 12 | 72. 62 |
| 13. 4 | 33. 3 | 53. 4 | 73. 1 |
| 14. 4 | 34. 4 | 54. 3 | 74. 8 |
| 15. 2 | 35. 3 | 55. 36 | 75. 1 |
| 16. 2 | 36. 1 | 56. 2 | 76. 4 |
| 17. 3 | 37. 3 | 57. 3 | |
| 18. 3 | 38. 3 | 58. 1 | |
| 19. 1432 | 39. 4 | 59. 1 | |
| 20. 3 | 40. 4 | 60. 20000 | |